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LIGHT-COLORED RESUPINATE POLYPORES—II

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Continuing the series of articles begun in *Mycologia* for March, 1920, descriptions and notes are here given of a number of resupinate polypores found mostly in the mycological herbarium of the New York Botanical Garden.

28. PORIA RIMOSA Murrill, Mycologia 12: 91. 1920

This species was described from an unnumbered packet of specimens collected on *Juniperus monosperma* in New Mexico, October 23, 1911, by Hedgcock and Long. I have recently come across other packets of the same thing carefully laid away under a manuscript name assigned, I believe, by Mr. Long. I regret that I did not have this name at hand to use in publishing the species. One packet bears the same data as the type of *P. rimosa*, with the statement that the fungus follows the rot caused by *Fomes texanus*. Another specimen was collected on *Juniperus sabinioides* near Austin, Texas, November 16, 1911, *W. H. Long 12024*. It also followed rot caused by *Fomes texanus*. A third specimen was collected by Mr. Long on dead fallen logs of *Juniperus* at Cache, Oklahoma, September 29, 1912; while a fourth, numbered *9870*, was obtained by Long and Hedgcock from a stump of *Juniperus monosperma* in New Mexico. The hymenium of these additional specimens is not nearly so closely rimose as in the type and the tubes are considerably longer.

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29. PORIA SEMITINCTA (Peck) Cooke, Grevillea **14**: 115. 1886

Polyporus semitinctus Peck, Ann. Rep. N. Y. State Mus. **31**: 37. 1879.

Described as follows from specimens collected by Peck on the under surface of maple chips at Griffins, Catskill Mountains, New York, in September.

"Subiculum thin, soft, cottony, separable from the matrix, whitish, more or less tinged with lilac, sometimes forming branching creeping threads; pores very short, unequal, whitish or pale cream-color, the dissepiments at first obtuse, then thinner, toothed on the edge.

"This is a soft, delicate species, with merulioid pores, similar to those of *P. violaceus*. The lilac stains appear on the subiculum only."

Three collections of this species in addition to the type are at Albany, collected by Peck at Ballston, South Bethlehem, and Lyndonville. According to Overholts, the spores measure 3–4 x 2 μ.

In the herbarium here, there is an excellent specimen from the "Catskill Mts." sent by Peck to Ellis, which is attached to chips and leaves and shows shallow tubes and a wide margin with rhizomorphic strands. During a recent visit to Albany, I compared this with Peck's type and found the two identical.

Another specimen, collected by Fairman at Lyndonville, New York, in 1890, was sent to Ellis for determination, but was never named. It corresponds in form to those at Albany from Ballston and South Bethlehem. The largest collection we have was made by Ellis at Newfield in October, 1879, on dead stems of *Kalmia latifolia* still standing. This bears the name "*Pol. aneirina* Fr.," doubtless assigned it by Cooke, and is described by Ellis as "Milk-white with a narrow, radiate-fibrose, snow-white margin. Pores oblique, medium size, margins thin, suberose."

30. PORIA MYCELIOSA Peck, Bull. N. Y. State Mus. **54**: 952. 1902

"Subiculum membranaceous separable from the matrix, connected with white branching strands of mycelium which permeate the soft decayed wood, or with radiating ribs which run through the broad sterile fimbriate white margin; pores very

short, subrotund angular or subflexuous, the dissepiments thin, acute, dentate or slightly lacerate, pale yellow; spores minute, subglobose, .00008–.00012 of an inch broad."

Described from specimens collected by Peck on much-decayed hemlock wood at Floodwood, New York, August 31, 1900. According to Overholts, the spores are ellipsoid, smooth, hyaline, 2.5–4 x 2 μ; cystidia none; clamp connections abundant. I have a specimen collected by Atkinson in North Carolina which appears to match the type at Albany exactly. Overholts also reports it from Frankfort, Michigan, collected on hemlock wood by E. T. Harper. This species should be very carefully compared with *Poria semitincta*, from which it can scarcely be distinguished when the herbarium specimens are placed side by side.

31. PORIA RADICULOSA (Peck) Sacc. Syll. Fung. **6**: 314. 1888

Polyporus radiculosus Peck, Bull. N. Y. State Mus. **40**: 54. 1887.

"Resupinate, effused, thin, soft, tender, orange-yellow, the mycelium creeping in and over the wood, silky-tomentose, at first white, then yellow, forming numerous yellow branching root-like strings or ribs which are more or less connected by a soft, silky tomentum; pores rather large, angular, at first shallow, sunk in the mycelium, the dissepiments becoming more elevated, thin and fragile; spores ellipsoid, .0002 to .00025 inch long, .00012 to .00016 broad.

"The species is allied to *P. Vaillantii*, in its peculiar rhizomorphoid strings of mycelium, but from this it differs decidedly in its color and texture. In these respects it approaches *P. bombycinus*, of which it may possibly be a peculiar variety. It is very destructive to the wood on which it grows, causing it to become soft, brittle and even friable."

Described as above from specimens collected by Peck at Ganse-voort in September on half-buried aspen chips. I have examined the type at Albany and find it very unsatisfactory. The plate recently published by Mr. Overholts represents it well. According to him, the spores are oblong-ellipsoid, 5–7.5 x 2.5–3 μ; cystidia none. The species will not be satisfactorily known by the present generation of mycologists until rediscovered.

32. PORIA FIMBRIATELLA (Peck) Sacc. Syll. Fung. **6**: 303. 1888

Polyporus fimbriatellus Peck, Ann. Rep. N. Y. State Mus. **38**: 91. 1885.

Originally described as follows from specimens collected by Dr. Peck on maple logs at Osceola, New York, in August. Also collected by him on a maple trunk at Ampersand Pond.

"Widely effused, thin, tenacious, separable from the matrix, with a thin white fimbriate margin and a white subiculum, running into rhizomorphoid branching strings of mycelium or forming a somewhat reticulate fimbriate membrane; pores minute, subrotund, equal, whitish inclining to cream color.

"By its rhizomorphoid mycelium this species is related to *P. Vaillantii*, but the pores are smaller and not collected in heaps as in that species. By reason of its tenacious substance it is readily separable even from an irregular matrix."

I have recently had an opportunity to examine the types of this species, which are well preserved at Albany. According to Overholts, the spores are ellipsoid, 2.5–3.5 × 2 μ; cystidia pointed, abundant, reaching 10–15 μ in diameter and projecting 10–30 μ.

33. PORIA GRISEOALBA (Peck) Sacc. Syll. Fung. **6**: 306. 1888

Polyporus griseoalbus Peck, Ann. Rep. N. Y. State Mus. **38**: 91. 1885.

Described as follows from specimens collected by Peck on soft, decaying wood of deciduous trees at Osceola, New York, in July.

"Effused, thin, tender, adnate, uneven, scarcely margined, indeterminate, grayish-white, with a thin pulverulent subiculum; pores very minute, subrotund, often oblique.

"The pores are sometimes collected in little heaps of tubercles as in *P. molluscus* and *P. Vaillantii*. In the dried state they are slightly tinged with creamy yellow."

The type specimens at Albany are pure-white, delicate, with fairly regular hymenium, reminding me somewhat of *Poria tenuis* Schw. and of plants referred to *Poria vulgaris* by many American mycologists.

34. **Poria linearis** sp. nov.

Effused for many centimeters, continuous, inseparable, thin; margin not cottony, but membranous to leathery, appressed, broad and conspicuous, white or whitish; context quite conspicuous, tough, membranous, white to cream-colored, persistent; hymenium appearing in scattered areas over the subiculum, becoming continuous but remaining somewhat uneven, white to pale-isabelline and at length pale-avellaneous; tubes rigid, thick-walled, oblique and appressed, often elongated to 1 cm. in length, 3 to a mm. or larger, mouths irregular, edges subentire; spores pip-shaped, smooth, hyaline, 5–7 x 3–4 μ.

Type collected on a dead, standing, corticated, hardwood trunk at Marraganti, Panama, April 3–9, 1908, *Robert S. Williams 1127*. Mature specimens are remarkable for the series of interrupted parallel lines made by the obliquely appressed, greatly elongated tubes.

35. **Poria hondurensis** sp. nov.

Effused for several centimeters, the area covered much longer than wide, continuous, inseparable, thin; margin not cottony, inconspicuous, white; context inconspicuous, a mere whitish membrane; hymenium even, milk-white and unchanging, considerably cracked in dried specimens; tubes rigid, angular, less than 1 mm. long, 3–4 to a mm., edges thin-walled, entire; spores ellipsoid, smoth, hyaline, 4 x 2.5 μ.

Type collected on the trunk and branches of a dead hardwood tree in British Honduras, during the winter of 1907, by *Morton E. Peck*. The wood remains rather firm but the bark has disappeared where the fungus occurs.

36. **Poria Johnstonii** sp. nov.

Effused for several centimeters, becoming continuous by confluence, inseparable, thin; margin conspicuous, cottony, milk-white even in dried specimens, much reduced with age; context thin, milk-white, of loosely-woven, cottony strands quite different from the usual membrane; hymenium uneven, white to cream-colored; tubes oblique, uniform in size and appearance, about 1 mm. long, angular, thin-walled, 3 to a mm., the edges projecting in long teeth; spore characters not satisfactorily obtained.

Type collected on the under side of a log of *Pseudotsuga macrocarpa* in the Upper San Antonio Canyon, San Antonio Mountains, Southern California, 5,700 ft. elevation, December 15, 1918, *I. M. Johnston 252*.

37. **Poria salicina** sp. nov.

Effused for many centimeters, becoming continuous by confluence, inseparable, rather thick; margin slight, appressed, fimbriate, white, inconspicuous with age; context a white membrane as thin as writing-paper; hymenium very uneven, white to cream-colored, glistening; tubes very thin-walled, somewhat collapsing and friable, mostly angular, very irregular in size and shape, 2–3 mm. long, usually about 3, but sometimes only 1, to a mm., edges becoming toothed or lacerate; spores ellipsoid, smooth, hyaline, 4.5 x 2.5 μ.

Type collected on a dead willow trunk at Fern Hollow, near Pittsburgh, Pennsylvania, October 16, 1906, *David R. Sumstine 25*. Also collected by Mr. Sumstine on the same host at Kittanning, Pennsylvania, September 8, 1907.

38. **Poria perextensa** sp. nov.

Covering the under side of a large log, practically continuous, inseparable, thin; margin conspicuous, white, felty or cottony, the extreme edge composed of appressed, radiating fibers, often connected with mycelial cords; context white, membranous, persistent; hymenium uneven, following the irregularities of the substratum and developing in patches on the subiculum, at length continuous and changing from white to ochroleucous and finally isabelline; tubes shallow and reticulate at first, maturing slowly, becoming 1 mm. long, angular, thin-walled, unequal, pliable and soft but not collapsing, 2–3 to a mm., edges entire to toothed or lacerate; spores subglobose to broadly ovoid, smooth, hyaline, 3 μ long.

Type collected on a much-decayed log of a deciduous tree at "Boarstone Camp," north of Willimantic, Maine, September 12–14, 1905, *W. A. Murrill 2520*. This camp, situated on the northern slope of Boarstone Mountain, was one of a number made by Mr. Ricker and myself during our explorations in Maine.

39. **Poria hymeniicola** sp. nov.

Appearing in circular patches on the hymenium of a dead *Tyromyces* and increasing to 2 cm. or more in diameter, continuous, inseparable, rather thick; margin cottony, conspicuous, pure-white even in dried specimens; context white, scarcely visible as a membrane but filling many of the tubes of the *Tyromyces*; hymenium uneven, white, glistening; tubes angular, thin-walled, reaching 2 mm. in length, about 5 to a mm. at maturity, a few considerably larger, edges entire to slightly toothed; spore characters not satisfactorily obtained.

Type collected on old hymenophores of a species of *Tyromyces* attached to a dead poplar trunk at "Camp Sunday," Medford Township, Maine, August 28, 1905, *W. A. Murrill 1920.*

40. **Poria separans** sp. nov.

Widely effused, continuous, separating smoothly from the substratum, rather thick; margin thin, cottony, white to cream-colored, scarcely apparent in old specimens; context a thin, tough, persistent, white membrane; hymenium very even, glistening, white to cream-colored; tubes thin-walled but not collapsing, regular in shape and size, reaching 2 mm. in length, concolorous within, angular, 4 to a mm., edges fimbriate-dentate; spores subglobose, hyaline, smooth, 5 μ.

Type collected on a dead log at East Hebron, New Hampshire, July 6, 1917, by *Percy Wilson.*

41. **Poria roseitingens** sp. nov.

Appearing in small, irregular patches on the bark and becoming several centimeters in extent by growth and confluence, inseparable, thin; margin filamentous, appressed, pure-white even in dried specimens, conspicuous in age; context white, a mere membrane; hymenium only tolerably even, milk-white when fresh, pale-rosy-isabelline when dry, except on the margin; tubes rather firm, very irregular in size, mostly 3 to a mm,, but often 1 mm. broad or larger, concolorous within, angular, thin-walled, edges entire to toothed or somewhat lacerate; spores copious, ellipsoid, hyaline, smooth, 3–4 x 2–2.5 μ.

Type collected on a dead corticated log of *Pinus Massoniana* at Cinchona, Jamaica, 5,000 ft. elevation, December 25–January 8, 1908–9, *W. A. & Edna L. Murrill 407.*

42. **Poria Cokeri** sp. nov.

Appearing first in circular patches a few millimeters across, then increasing to a centimeter, and finally becoming confluent in areas 5 cm. or more long and 2 cm. wide, inseparable, rather thick, especially at the center of the patches; margin coarsely radiate-fibrous to membranous, conspicuous, 2–3 mm. broad when fairly young, milk-white even when dry; context white, membranous; hymenium somewhat uneven, white to slightly dirty-white, pale-ferruginous where bruised; tubes quite rigid, irregular in shape and size, 2–3 mm. long, concolorous within, mouths irregularly rounded or slightly angular, usually 3, but sometimes only 1, to a mm., edges entire to toothed; spores rounded-ovoid, smooth, hyaline, with a very distinct nucleus, $4 \times 3\ \mu$.

Type collected on dead stems of a hedge of *Ligustrum vulgare* at Chapel Hill, North Carolina, December 9, 1914, *W. C. Coker 1506*. What appears to be the same species was collected on rotting hardwood logs at Star City, West Virginia, May 3, 1907, *Carl P. Hartley 51*.

43. **Poria distorta** sp. nov.

Widely effused, following the irregularities of the substratum, more or less continuous, separable, of medium thickness, drying in concave, distorted masses; margin broad when young, white to slightly discolored, cottony to membranous; context white, conspicuous, tough, membranous, persistent; hymenium very uneven, often nodulose, white to cremeous or somewhat discolored; tubes often oblique, fairly regular in shape and size when fully mature, 1–2 mm. long, concolorous within, thin-walled, angular, 4–5 to a mm., edges rather firm, entire to slightly toothed; spores ellipsoid, smooth, hyaline, $3.5 \times 2.5\ \mu$.

Type collected on very rotten wood in Pink Bed Valley, near Asheville, North Carolina, about 4,000 ft. elevation, July 13–24, 1908, *W. A. Murrill & H. D. House 427*.

44. **Poria submollusca** sp. nov.

Effused for several centimeters, continuous, inseparable, thin; margin cottony, delicate, conspicuous, milk-white even in dried specimens; context white, membranous; hymenium rather even, white, slightly cremeous in dried specimens; tubes mostly oblique, showing a tendency to collapse at times, becoming irregular in size and shape, 1–2 mm. long, concolorous within, thin-walled,

mouths angular, 4–5 to a mm., edges at first entire but soon becoming notched or lacerate; spore characters not satisfactorily obtained.

Type collected on rotting bark and wood of hickory at St. Martinsville, Louisiana, August 3, 1889, *A. B. Langlois 1883*. What appears to be the same species is in the Underwood herbarium, collected at Ocean Springs, Mississippi, in 1896, on decayed pieces of the wood and bark of some deciduous tree.

45. **Poria lignicola** sp. nov.

Effused for several centimeters, becoming continuous, closely adhering, inseparable, thin; margin broad, conspicuous, white to pale-isabelline, cottony; context tough, membranous, persistent, pale-isabelline; hymenium even, glistening, pale-rosy-isabelline; tubes rigid, regular, angular, less than 1 mm. long, often oblique, thin-walled, 3–4 to a mm., edges almost entire; spore characters not satisfactorily obtained.

Type collected on a decorticated hardwood log at Alto Cedro, Cuba, March 19–20, 1905, *F. S. Earle & W. A. Murrill 482*. Also collected at the same time on a similar host, *F. S. Earle & W. A. Murrill 448*.

46. **Poria montana** sp. nov.

Effused for several centimeters, continuous, inseparable, rather thick; margin very slight, thin, closely appressed, pure-white even in dried specimens; context white, ordinarily a mere membrane, but in cracks or hollows in the decayed substratum becoming dense and cottony; hymenium even, glistening, white to straw-colored; tubes rigid, fairly regular in shape and size, angular, about 6 to a mm. and reaching 3 mm. in length, edges thin, entire; spore characters not satisfactorily obtained.

Type collected on a well-rotted coniferous trunk near New Haven Gap, above Cinchona, Jamaica, 5,600 ft. elevation, January 4, 1909, *W. A. & Edna L. Murrill 765*.

47. **Poria arachnoidea** sp. nov.

Effused for several centimeters, continuous, inseparable, thin; margin broad and very delicate, like a spider's web, white to cream-colored; context inconspicuous; hymenium even, white to

cream-colored, glistening, continuous at maturity; tubes delicate, regular, angular, scarcely 1 mm. long, 4 to a mm., edges very thin-walled, entire; spore characters not satisfactorily obtained.

Type collected on a much-decayed piece of oak wood near St. Martinsville, Louisiana, October 25, 1897, *A. B. Langlois 2556*. Also collected at Opeloussas, Louisiana, May 14, 1889, *A. B. Langlois 1734*. Accompanying the latter specimen is a field note referring to the arachnoid, white subiculum as a very peculiar character.

NEW YORK BOTANICAL GARDEN.

DARLUCA ON PERIDERMIUM PECKII*

J. F. Adams

(With Plate 21)

The genus *Darluca* in the family Sphaeropsidiaceae of the Fungi Imperfecti includes species which are reported on the leaves of deciduous plants as well as being parasitic on the Uredineae.

Darluca filum (Biv.) Cast. is a species most commonly mentioned as a frequent parasite on various species of Uredinales. Saccardo[15] states that it is uredinicolis and Sydow[18] and Grove[9] refer to it as a parasite growing on the uredo layer. Lindau[11] reports it as cosmopolitan on aecidia of various uredinia. Rostrup[14] lists it on *Chrysomyxa abietis* (2346). Cornu[7] says it attacks the telia of *Puccinia Prunorum* and *Puccinia Caricis*. Fuckel[8] finds it on urediniospores of various species and teliospores of *Uromyces Cytissi*. Tulasne[19] reports *Diplodia punctata* which corresponds to *Darluca filum* on *Uredo farinosa, U. falicis, U. Euphorbiae* and *U. Epilobii*. Broisi[3] has mentioned this parasite on *Puccinia bromia* and *Puccinia Triseti*.

McAlpine[12] finds it quite common for the uredo-layer to be attacked by this fungus and has found it upon 24 per cent of the species of *Puccinia*. "It occurs on aecidia, uredo and teleuto layers, and is recorded on *Uromyces, Uromycladium, Puccinia, Phragmidium* and in *Uredo*.

Cobb[6] unquestionably discusses this same parasite in connection with the peach rust (*Tranzchelia punctata*). He states "I frequently find among the Uredospores of a parasite of this rust small black pycnidia producing a multitude of two-celled spores, which when placed in a moist chamber often bud and multiply after the manner of yeast plants, but which occasionally produce a mycelium. Further, I find in the pustules of a number of Australian rusts similar tiny black pycnidia, producing similar two-

* Contribution from the Department of Botany, The Pennsylvania State College, No. 23.

celled spores which behave in precisely the same manner. Among other rusts producing these bodies is that occurring on Acacias, and that which occurs on a species of *Agropyron*, probably the species *scabrum*. There *a priori* two ways accounting for these pycnidia, either (1) they are parasites on the rust, or (2) they are an integral part of the rust, and represent another spore form of the rust." "These two-celled bodies have, as I have in several occasions publicly remarked, no slight resemblance to the so-called spermagonia of several species of *Aecidium* and this idea has already been fruitful of considerable discussion. Do not the various bodies that have in this connection been called spermagonia and spermatia need a more careful examination than they have yet received."

Halsted[10] reports it on the uredo sorus of the asparagus rust and "in some localities this parasite upon the asparagus rust has been so abundant as to make it difficult to find a fully developed rust spot free from *Darluca*." Sirrine[17] finds it spreads upon the uredo stage of the asparagus rust. "During past summer (1900) *Darluca* attacked the aecidial stage of the rust about June 10. We have even found sori in which the uredospores were apparently destroyed by *Darluca* while at the bottom of the sorus a layer of evidently healthy winter spores would be found." He is of the opinion "that *Darluca* attacks the spores of only the aecidial and uredo stages and does not injure the vegetative portions." Clinton[5] reports it on the aecia, uredinia and telia of the asparagus rust and occurring on the carnation and blue grass rust. Pammel and Hodson[13] consider it does much to prevent the ravages of the asparagus rust and report it common in 1900 on corn rust.

Darluca filum is frequently found on *Kueneola obtusa* in the eastern states. I have studied also material growing on *Coleosporium delicatulum* on *Euthamia tenuifolium* and on *Dicaeoma poculiforme* on *Phleum pratense*. Ellis and Everhart list *Darluca arcuata* on the andropogan rust which differs from *D. filum* by having three celled spores.

The parasite is easily recognized when found on the Uredinia and telia sori. It appears to overrun the sori after developing aggregate black pycnidia that appear as in a stroma. It apparently checks spore formation and distribution.

I have been unable to find in the literature where *Darluca filum* has been reported on any species of rusts attacking Gymnosperms. The writer collected material of *Peridermium Peckii* on *Tsuga canadensis* at Charter Oak, Center County, Pa., for study in the early stages of the development of the aecidium. The material was collected May 20, 1917 and at this time it was possible to find infected leaves with immature as well as sporulating aecia. The young infected leaves are easily recognized by their yellow appearance. At this time there was no evidence of *Darluca* growing on any of the rust infected leaves. The parasite was only recognized on examining sections through rust infected leaves of material collected in 1917.

During the spring of 1919 rust infected leaves of hemlock were carefully examined and in several instances mature aecia were found which were parasitized with *Darluca*. The black pycnidia could be recognized in the sori but not as conspicuous as found on other species of rust. The infection can be easily overlooked. Additional material was collected and fixed for further study.

On the leaves of hemlock, *Peridermium Peckii* forms two rows of conspicuous cylindrical aecia which are erumpent on the under surface. The pycnia develop subcuticularly and frequently were formed on the upper surface but more commonly on the under surface of the needle.

The mycelium of the rust is distributed throughout the leaf and the aecial primordia originate between the fibro vascular bundle and lateral resin duct. It has been observed that the aecia rupture at a stoma possibly because of least resistance. The mycelium of the parasite is similar in size to that of the rust but can be distinguished easily by the smaller nuclei, less cytoplasmic contents and sparsely septate mycelium.

Infection by *Darluca* may occur with the aecial primordia or mature aecia. When the primordia of the aecia are infected considerable disorganization of the rust mycelium occurs. The pycnidia of the parasite appear to suppress development by encroachment. The hyphae making up the aecial primordia do not show the normal nuclei or protoplasmic contents. These hyphae by their strong affinity for the stain and poor stainable contents

indicate their disorganization. No further cytological evidence could be observed between the parasite and rust. The preparations were examined carefully for haustoria or other penetration of the rust mycelium by the parasite. Where mature aecia are infected the parasite appears to be concerned in suppressing spore distribution. The pycnidia develop in the aecial cup with the peridia still entact. Only a few mature spores are found below the pycnidium. The mycelium of the parasite ramifies throughout the spore mass and appears to engulf the spores. Several instances were found where the pycnia were parasitized upon the upper surface of leaves. Considerable disorganization of the pycnia were observed to follow such infection. I have been unable to find in the literature where this rust stage has been reported infected by *Darluca.*

My observations indicate that the resultant effect of the parasite is to prevent aecia maturing and suppress spore distribution. Owing to the deep origin of the aecia, the pycnidia of the parasite are submerged or endogenous and not easily recognized in contrast to its growth on other species of rusts. This sort of hidden relation between parasite and rust may be more common than heretofore supposed.

Sappin Trouffy[16] has studied *Darluca filum* on the uredinia of *Puccinia Porri.* He finds the mycelium ramifies throughout the sori and becomes attached to the urediniospores by "crampons." It is stated that the parasite assumes a "rôle destructeur." His illustration (Fig. 2) shows the mycelium of the parasite in the uredinia with apparent haustoria penetrating the sub-basal cells of the sori as well as the "crampons" attached to spores. He finds the parasite presents the same characters on *Puccinia graminis* and *Puccinia Menthae.* I have been unable to observe this situation in any of my preparations.

The original description of *Darluca* by Castagne[4] and that given by Saccardo[15] is different with respect to the morphology of the spores. I have not been able to determine the reason for the change from the original description by Saccardo.[15] The following discussion presents the facts so far as I am able to determine regarding the presence or absence of bristle spores.

Bivona described this parasite as *Sphaeria filum* (Tab. 3, f. 1, C. C. D. E.) but no mention is made of bristle spores. Castagne[4] established the genus *Darluca* making *Darluca vagans* (Cast. herb.) and *Sphaeria filum* Biv. synonyms and the fungus then became known as *Darluca filum* (Biv.) Cast. Castagne[4] makes no reference to the presence of bristle spores and that he took cognizance of the other synonyms is indicated in the following quotation. "Cette plante a d'abord été décrité par Bivona sous le nom de *Sphaeria filum*, M. Fries dans son Systema mycologicum, t. 2, p. 547, en fit son *Phoma filum*, puis dans l'Elenchus fungorum, t. 2, p. 119, il l'a rangée dans le genre *Septoria*; elle devint le *Septoria filum*. M. le Docteur Montagne est de la même opinion et la place dans la tribu des *Ascospora*; C'est pour lui le *Septoria* (*Ascospora*) *filum*. M. le Docteur Léveillé pense que c'est un Diplodia qu'on pourrait désigner sous le nom de *Diplodia punctata*; M. Desmazieres en fait un *Hendersonia* et il le décrit sous le nom d'*Hendersonia uredinaecola* (Ann. des. Sc. Nat., 3 serie, t. 11, p. 345), et un *Diplodia* dans les Plantes Crypt. de France, 1486, sous le nom de *Diplodia uredinaecola*; enfin M. Berkeley, que j'ai consulté sur cette controverse, pense qu'on doit en faire un *Sphaeronema*. La variété d'opinion des premiers cryptogamistes d'Europe a' ce sujet, m'engage á proposer la création d'une genre nouveau pour botanistes sous le nom de *Darluca vagans*. Le Nom de *Darluca* est un hommage rendu á la mémoire de Michel Darluc, docteur en medecine, mort en 1783, anteur d'une histoire naturelle de Provence."

No mention is made of bristle spores in *Hendersonia* (*Sphaerospora*) *uredineaecola* Desmaz. or *Diplodia* (*Hyalospora*) *uredineaecola* Desmaz. The descriptions as well as the illustrations of the spores in *Phoma Filum* Fr. and *Darluca vagans* Cast. are without bristles.

So far as I have been able to determine the first mention of bristle spores is in Saccardo's[15] description of *Darluca* Cast. where he states that the spores are "untrinque mucosa—vel. subpenicillata-apiculatae" and in *Darluca filum* (Biv.) Cast. he states the spores are described as "breve mucosa-penicillatis." However, in the case of *Darluca Sorghi* Zimm. no mention is made of

bristle spores. Lindau[11] illustrates the spores with two or three bristles at each end.

Sappin-Trouffy[16] in his studies of this parasite has failed to observe the presence of bristle spores. Underwood[20] refers to the spores as similar to *Ascochyta* and *Actinonema* which are without bristle appendages. Blodgett[2] illustrated this parasite on the carnation rust but did not observe the presence of bristle spores.

I have failed to find the presence of bristles on young or mature spores of this parasite growing on the three species of rust I have studied. In this respect the form I have studied would agree with the original description of Castagne and Bivona. It is possible that another form appears similar to this species but with bristle spores, in which case it should be considered as a new species. A monograph of this genus undoubtedly would clear up the inconsistency with respect to the morphology of the spores. The bristles may be present only with young spores as indicated in the species *Darluca Bivonae* Fuckel as Allescher[1] reports the young spores possess bristle ends but absent with mature spores.

Saccardo[16] lists *Darluca Sorghi* Zimm. as a parasite on *Puccinia purpureae* without bristle spores. This species agrees with Castagne's original description as well as with the form I have studied.

The pycnidia vary somewhat in size on the three species of rust I have studied but agree with the measurements of other authors. Castagne says the spores vary from two to three celled but the three celled are rare. Slight variations in the spores are found but not so great as to designate them as separate species. I have found the spores uniformly two-celled. Saccardo gives the following measurements: *Darluca filum,* 3 to 4 x 15 to 18 μ; *Darluca Sorghi,* 4 to 13 x 16 μ. The following spore measurements I have taken from fresh material: *Darluca filum* (Biv.) Cast. on *Peridermium Peckii,* 3 to 4 x 13 to 19 μ; *Darluca filum* (Biv.) Cast. on *Coleosporium delicatulum,* 3 to 7 x 10 to 16 μ; *Darluca filum* (Biv.) Cast. on *Puccinia graminis,* 3 to 7 x 12 to 16 μ.

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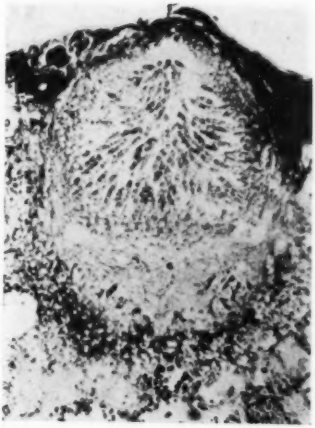

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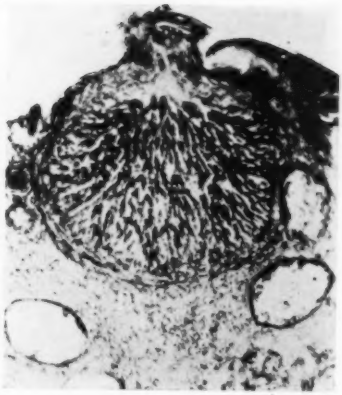

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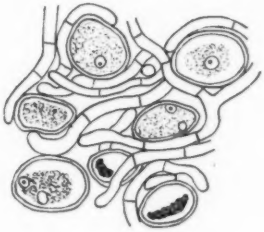

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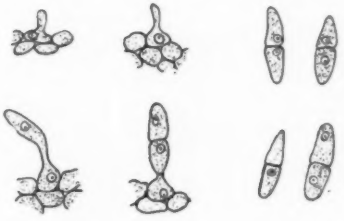

4 5

DARLUCA ON PERIDERMIUM PECKII

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EXPLANATION OF PLATE 21

Fig. 1. Photomicrograph of a cross section of the pycnidium of *Darluca filum* on the aecium of *Peridermium Peckii*. Just below the pycnidium the disorganized aecium is evident. The basal cells and sub-basal tissue is completely collapsed. Several aeciospores are evident below the pycnidium.

Fig. 2. Photomicrograph of a cross section of the pycnidium of *Darluca filum* on the primordium of the aecium of *Peridermium Peckii*. The primordium of the aecium is evident just below the pycnidium. The primordium is not disorganized but the cells have degenerated and show little protoplasmic contents. Early infection of a primordium prevents any further development.

Fig. 3. Mycelium of *Darluca filum* ramifying and engulfing the aeciospores in a mature aecium of *Peridermium Peckii*. Plasmolysis of the spores is associated with the establishment of *Darluca*.

Fig. 4. Various stages in spore development of *Darluca filum*.

Fig. 5. Typical two celled spores of *Darluca filum*.

A LIST OF THE PYRENOMYCETES OF PORTO RICO COLLECTED BY H. H. WHETZEL AND E. W. OLIVE[1]

CARLOS E. CHARDON

The following list of Pyrenomycetes of Porto Rico is based on material collected by Prof. H. H. Whetzel and Dr. E. W. Olive during a brief stay at the Island in the spring of 1916. A detailed account of their expedition need not be given here, since it has been previously published.[2] Their attention was directed mainly towards the rusts, but fungi belonging to other groups were also collected. The Pyrenomycetes stand in second place from the standpoint of the number of species collected. The Uredinales have been studied by Dr. J. C. Arthur,[3] and recently several papers have appeared dealing with some of the Pyrenomycetes[4, 5, 6]. However, a detailed list of the members of this group has not been published, and since many of them are discussed in the papers of Prof. F. L. Stevens and his students, it has been relatively easy to identify most of the specimens, in as far as they are known.

All doubtful determinations have been excluded. Specimens representing what are believed to be new species have been set aside for further study.

During the preparation of the list, help has been received from a number of mycologists. I wish especially to acknowledge my indebtedness to Prof. F. L. Stevens of the University of Illinois, Prof. C. R. Orton of Pennsylvania College, Mr. C. G. Lloyd of Cincinnati, Ohio, Prof. F. S. Earle of the Insular Experiment Station at Rio Piedras, P. R., and Dr. F. J. Seaver of the New

[1] Two species of Hysteriales are included.

[2] Brook. Bot. Gard. Rep. **5**: 117–121. 1916.

[3] Mycologia **9**: 55–104. 1917.

[4] Mycologia **11**: 163–167. 1919.

[5] Mycologia **12**: 93–98. 1920.

[6] Mycologia **12**:206–267. 1920.

York Botanical Garden. Finally, an expression of my appreciation is due to Prof. H. M. Fitzpatrick, who suggested the publication of the list and who assisted in the preparation of the manuscript, and to Prof. H. H. Whetzel, who has placed at my disposal all of his material.

A total of 112 specimens, representing 65 species, is listed below. The date of the collection has been omitted in all cases. Following the citation of the locality, the accession numbers applied to the specimens by the collectors are given.

I. HYSTERIALES

1. LEMBOSIA COCCOLOBAE Earle.
   On *Coccolobis uvifera.* Mayaguez, *522, 523.*
2. LEMBOSIA DIFFUSA Winter.
   On *Miconia prasina.* Maricao, *665.*

II. PERISPORIALES

1. Erysiphaceae

So far as known, the members of this group never develop perithecia under the climatic conditions of the island, and are known only in the oidium stage. Hence, only tentative determinations based on the host can be made. It has seemed best, therefore, to omit them from the present list.

2. Perisporiaceae

3. DIMERIUM GRAMMODES (Kuntze) Garman.
   On *Crotalaria retusa.* Anasco, *663;* Mayaguez, *648, 662.*
   On *Meibomia barbata.* Anasco, *652;* El Duque, *661.*
   On *Phaseolus adenanthus.* Mayaguez, *660;* Tanama River, *659.*
   On *Vigna repens.* Mayaguez, *536, 653.*
4. DIMERIUM STEVENSII Garman.
   On *Cordia corymbosa.* Mayaguez, *637.*
5. MELIOLA ANDIRAE Earle.
   On *Andira jamaicensis.* Mayaguez, *583.*
6. MELIOLA BICORNIS var. CALOPOGONIS Stevens.
   On *Calopogonium orthocarpum.* Utuado, *614.*
7. MELIOLA DIFFENBACHIAE Stevens.
   On *Diffenbachia sequine.* Mayaguez, *585, 686.*
8. MELIOLA GLABROIDES Stevens.
   On *Sauvagesia erecta.* Maricao, *616.*
9. MELIOLA GUAREICOLA Stevens.
   On *Guarea trichiloides.* Mayaguez, *593.*
10. MELIOLA IPOMOEAE Earle.
    On *Ipomoea batatis.* Mayaguez, *605.*
    On *Ipomoea tiliacea.* Mayaguez, *606.*

11. MELIOLA LONGIPODA Gaill.
On *Cordia borinquensis.* El Yunque, *610.*
12. MELIOLA MAYAGUESIANA Stevens.
On *Palicourea procea.* Mayaguez, *589, 596.*
13. MELIOLA MELASTOMACEARUM Speg.
On *Miconia racemosa.* Mayaguez, *588.*
14. MELIOLA NIGRA Stevens.
On *Laguncularia racemosa.* Mayaguez, *587.*
15. MELIOLA PANICI Earle.
On *Icanthus pallens.* Mayaguez, *579;* El Yunque, *577.*
On *Olyra latifolia.* Maricao, *552.*
On *Panicum glutinosum.* Maricao, *578.*
16. MELIOLA PAULLINIAE Stevens.
On *Paullinia pinnata.* Mayaguez, *598.*
17. MELIOLA PSIDII Fr.
On *Psidium guajava.* Mayaguez, *600, 737, 529;* Maricao, *599.*
18. MELIOLA PSYCOTRIAE Earle.
On *Randia aculeata.* Barceloneta, *607, 608.*
19. MELIOLA PTERIDICOLA Stevens.
On *Adiantum latifolium.* Mayaguez, *582, 620, 581.*
20. MELIOLA SEPULTA Pat.
On *Avicennia nitida.* Martin Pena, *612.*
21. MELIOLA TECOMAE Stevens.
On *Tecoma pentaphylla.* Maricao, *595.*
22. MELIOLA TORTUOSA Wint.
On *Piper peltatum.* Mayaguez, *591.*
23. PERISPORIUM BROMELIAE Stevens.
On *Bromelia pinguin.* Barceloneta, *504;* Mayaguez, *505.*
24. PERISPORIUM TRUNCATUM Stevens.
On *Inga laurina.* Maricao, *601.*
On *Inga vera.* Mayaguez, *533, 602.*

3. **Coryneliaceae**

25. CORYNELIA PORTORICENSIS Fitzpatrick.
On *Podocarpus coriaceus.* Maricao, *698.*

4. **Microthyriaceae**

26. MICROPELTIS AERUGINESCENS Rehm.
On *Rourea glabra.* Rio Piedras, *645.*

III. HYPOCREALES

1. **Nectriaceae**

27. CALONECTRIA ERUBESCENS (Rob.) Sacc.
On *Piper peltatum,* generally associated with a Meliola (*M. Tortuosa?*). Maricao, *592;* Mayaguez, *603, 590.*
28. CREONECTRIA BAINII (Massee) Seaver.
On pods of *Theobroma cacao.* Mayaguez, *no accession number.*

29. CREONECTRIA GRAMMICOSPORA (F. & W.) Seaver.
On dead branch of tree. Maricao, *no accession number.*
30. MEGALONECTRIA PSEUDOTRICHIA (Schw.) Seaver.
On dead branch of tree. Maricao, *731.*
On dead bar of *Cordia macrophylla.* Mayaguez, *678.*
31. SCOLECONECTRIA TETRASPORA Seaver.
On fence post. Mayaguez, *672.*
32. SPHAEROSTILBE COCCOPHILA (Desmaz.) Tul.
On scale insects on *Citrus decumana.* Barceloneta, *728.*

2. Hypocreaceae

33. DOTHICHLOE ARISTIDAE Atkinson.
On *Aristida portoricensis.* Mayaguez, *695.*
34. HYPOCRELLA TAMONEAE Earle.
On *Miconia sp.* Maricao, *472.*
35. HYPOCRELLA TURBINATA (Berk.) Seaver.
On *Adiantum petiolatum.* Mayaguez, *716, 717.*
On *Adiantum pulverulentum.* Mayaguez, *722.*
On *Adiantum sp.* Mayaguez, *718, 719, 720, 721;* Maricao, *723;* Anasco, *724.*
36. HYPOCRELLA GUARANITICA Speg.
On *Inga laurina.* Maricao, *734.*

IV. DOTHIDEALES

37. AUERSWALDIA CECROPIAE P. Henn.
On *Cecropia peltata.* Mayaguez, *569;* Barceloneta, *570.*
38. AUERSWALDIA MICONIAE P. Henn.
On *Miconia* sp. Maricao, *697, 696.*
39. CATACAUMELLA GOUANIAE Stevens.
On *Gouania lupuloides.* Mayaguez, *562;* Maricao, *470.*
On *Gouania polygama.* Maricao, *565.*
40. DOTHIDELLA FLAVA Stevens.
On *Lithacne pauciflora.* Mayaguez, *547, 425.*
41. MYRIOGENOSPORA BRESADOLEANA P. Henn.
On *Andropogon bicornis.* Rio Piedras, *681, 682.*
On *Axonopus compressus.* Mayaguez, *683.*
On *Icanthus pallens.* Tanama River, *686.*
On *Paspalum conjugatum.* Maricao, *684, 685.*
42. PHYLLACHORA ANDROPOGONIS (Schw.) Karst. & Har.
On *Paspalum notatum.* Barceloneta, *558.*
43. PHYLLACHORA BOURRERIAE Stevens & Dalby.
On *Bourreria succulenta.* Barceloneta, *572.*
44. PHYLLACHORA CYPERI Rehm.
On *Cyperus giganteum.* Mayaguez, *576.*
45. PHYLLACHORA ENGLERI Speg.
On *Anthurium dominicense.* El Yunque, *644.*
46. PHYLLACHORA GALACTIAE Earle.
On *Galactia striata.* Barceloneta, *575;* San German, *571.*

47. PHYLLACHORA GRAMINIS (Pers.) Fuckel.
On *Valota insularis.* Barceloneta, *551.*
48. PHYLLACHORA MAYEPEAE Stevens & Dalby.
On *Mayepea domingensis.* Maricao, *567.*
49. PHYLLACHORA MINUTA P. Henn.
On *Paritium tiliaceum.* Catano, *650.*
50. PHYLLACHORA NITENS Garman.
On *Schlegelia brachyantha.* El Yunque, *640.*
51. PHYLLACHORA PERIBEBUYENSIS Speg.
On *Tetrazygia elaeagnoides.* Barceloneta, *636.*
52. PHYLLACHORA PHASEOLI P. Henn.
On *Phaseolus adenanthus.* Tanam River, *659.*
53. PHYLLACHORA ROUREAE Sydow.
On *Rourea glabra.* Mayaguez, *626;* El Yunque, *646.*
54. PHYLLACHORA SECURIDACAE P. Henn.
On *Securidaca virgata.* Mayaguez, *564;* Maricao, *563.*
55. PHYLLACHORA SPHAEROSPERMA Wint.
On *Cenchrus echinatus.* Campo Alegre, *437.*

V. SPHAERIALES

1. Cucurbitariaceae

56. ROSTRONITSCHKIA NERVINCOLA Fitzpatrick.
On *Gesneria albiflora.* Maricao, *699.*

2. Coryneliaceae[7]

[7] The Coryneliaceae are included above under the Perisporiales.

3. Mycosphaerellaceae

57. GUIGNARDIA PIPERICOLA Stevens.
On *Piper medium.* Rio Piedras, *635.*
58. MYCOSPHAERELLA DIDYMOPANICIS Miles.
On *Didymopanax Morotoni.* Maricao, *516.*
On *Didymopanax* sp. Maricao, *515.*
59. MYCOSPHAERELLA PERSEAE Stevens.
On *Persea gratissima.* Yauco, *337.*

4. Pleosporaceae

60. PHYSALOSPORA ANDIRAE Stevens.
On *Andira jamaicensis.* Martin Pena, *566.*

5. Clypeosphaeriaceae

61. LINOSPORA TRICHOSTIGMAE Stevens.
On *Trichostigma octandra.* Yauco, *656.*

6. Xylariaceae

62. NUMMULARIA CINCTA Ferd. & Wing.
On wood. Maricao, *675*.

63. XYLARIA APICULATA Cooke.
On wood. Mayaguez, *674*.

64. XYLARIA ARISTATA Mont.
On dead leaves of *Clusia rosea*. Mayaguez, *677*.

65. XYLARIA AXIFERA Mont.
On fallen herbaceous stems. Maricao, *no accession number*.

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THE FUNGI OF BLACKSBURG, VIRGINIA

W. A. Murrill

During the latter half of July, 1920, the following fungi—over 150 species—were found by the writer in the vicinity of Blacksburg, Virginia, mostly in oak-chestnut groves with white oak predominating. The elevation is 2,200 feet and the underlying rock near the town is Trenton limestone, while on Brush Mountain, a mile or two to the north, the soil had its origin in subcarboniferous shales and sandstones. On account of the excellent season, many valuable field notes and several novelties were obtained, especially of the fleshy forms. Attention is called to observations in connection with *Ceriomyces retipes, Hexagona alveolaris, Vaginata plumbea,* and *Venenarius cothurnatus.*

A. ASCOMYCETES

Bulgaria rufa. More abundant than I have ever before seen it, on fallen dead branches and trunks of white oak in Preston's Woods and elsewhere.

Hypomyces lactifluorum. Common where I found it last year and enjoyed a mess of it mixed with the common *Chanterel.*

Leotia stipitata.

B. HYMENOMYCETES

a. Tremellales

Tremella frondosa.

Tremella mycetophila. On *Gymnopus dryophilus.*

Tremella sparassoidea. Under white oak. See figure and description by Overholts in *Mycologia* for May, 1920.

b. Agaricales

1. Thelephoraceae

Craterellus cornucopioides. Found three times.

Lachnocladium Schweinitzii. Abundant.

Thelephora spp. Three or four interesting species, mostly of the *T. palmata* group.

2. Clavariaceae

Clavaria cristata. Found twice on a hillside in Preston's Woods growing in dense clusters among grass and leaves. Lemon-yellow, with a distinct odor difficult to define, the taste bitterish but not farinaceous.

Clavaria flava. Frequent in shaded situations.

Clavaria fusiformis. Found twice. A splendid typical cluster was collected under *Rhododendron maximum* at the foot of Brush Mountain near Kanode's Mill.

Clavaria inaequalis. Found once.

Clavaria muscoides. A small species growing in moss at the base of a white oak in Preston's Woods. Lemon-yellow throughout, fragile, taste farinaceous and bitterish, odor none.

Clavaria sp. In leaf-mold under an oak in Preston's Woods. Large and beautifully colored, reminding one of a bunch of coral. Rose-pink and flavous to slightly chrome-yellow. Flavor fine, odor none. Dr. Coker has found this species in North Carolina and will describe it.

3. Hydnaceae

Hydnellum zonatum?. Gregarious and abundant on a dry bank on Brush Mountain among roots and weeds. Thin, dry, small, with pale margin and strongly farinaceous odor and taste.

Manina cordiformis. Found in Preston's Woods in a dead spot on a living trunk of pig-nut hickory.

Steccherinum adustum. Common. I found a fine clump on a white oak log.

Steccherinum pulcherrimum. On a white oak log. Large, imbricate, isabelline with fulvous strains on the surface; context tough, sweetish.

4. Xylophagaceae

Merulius tremellosus. On a white oak log.

5. Polyporaceae

Bjerkandera adusta.

Cerrena unicolor.

Coriolus versicolor.

Daedalea confragosa.

Daedalea juniperina. On red cedar stump on the bank of Toms Creek. This rare species was previously known from Kansas, Missouri, Kentucky, and South Carolina, always confined to red cedar.

Daedalea quercina. On an oak stump. A rare species in this locality.

Elfvingia lobata. Abundant on white oak stumps and at the base of living red maple, hickory, white oak, etc. Evidently parasitic, like its northern relative, *E. megaloma.*

Fulvifomes Robiniae. Common on black locust trunks about Blacksburg and at Mountain Lake.

Grifola Berkeleyi. I found three very large specimens, all growing by oak trees.

Grifola flavovirens. On the ground in woods, where I found it many years ago.

Hexagona alveolaris. Common on fallen hickory branches. *H. striatula* was also common on the same host but not on the same actual branch. I think it is undoubtedly only a variety of *H. alveolaris.* In Europe, this species causes a serious disease of the English walnut and we must be prepared to expect it in our walnut and hickory orchards in this country.

Laetiporus sulphureus. Covering an oak stump.

Polyporus arcularius. Frequent on fallen sticks.
Polyporus elegans.
Poronidulus conchifer.
Pycnoporus cinnabarinus. On oak fence rails,—an uncommon host.
Tyromyces lacteus.
Tyromyces semipileatus. On a white oak log.

6. Boletaceae

Ceriomyces affinis. Found twice.
Ceriomyces bicolor.
Ceriomyces chromapes.
Ceriomyces communis. Abundant.
Ceriomyces edulis. Found a few times,—the brown form only.
Ceriomyces fumosipes. Found once or twice.
Ceriomyces griseus. Found several times, usually growing alone, but once near *C. retipes.* The species is very distinct from *C. retipes* and is never bitter, even in old plants.
Ceriomyces retipes. Several beautiful yellow specimens were found in oak groves, none of them resembling *C. ornatipes* in color, and all of them very distinct from *C. griseus.* Careful observations were made on all specimens found, and it was established beyond a doubt that *C. retipes* is decidedly bitter in all stages and therefore unfit for food, while *C. griseus* is edible. The stipe is much the same in both species but in *C. griseus* the reticulations are smaller and more shallow. The tubes, flesh, and surface, as well as taste, are decidedly different in the two plants.
Ceriomyces subglabripes. Found two or three times in grassy oak woods. Pileus reddish-fulvous, glabrous, rugose; flesh lemon-yellow, with taste reminding one of potassium nitrate; tubes and stipe also lemon-yellow.
Ceriomyces sp. Gregarious under white oaks. Fulvous, rugose, 7–10 cm. in diameter; context nutty, white, becoming skin-colored when bruised; tubes lemon-yellow, browning when bruised; stipe yellowish, chaffy, 10–12 × 2–2½ cm. Characterized by numerous scurfy particles on the stipe. I found upon my return that Dr. Coker had recently collected this same species in North Carolina, so I have suggested that he name it and include the Blacksburg locality.
Rostkovites granulatus.
Strobilomyces strobilaceus. Frequent.
Suillellus luridus. Abundant.
Tylopilus felleus. Very common and large. One group was practically white, growing in an opening in the woods. Could they have been bleached?
Tylopilus gracilis.

7. Agaricaceae

Agaricus sp. Only two specimens were found and these were solitary at different points in oak groves.
Armillaria putrida. Found only once.
Chanterel Chantarellus. Abundant.
Chanterel floccosus.

Chanterel infundibuliformis.

Clitocybe adirondackensis. Quite abundant in white oak woods, growing gregariously.

Clitocybe illudens. Frequent about stumps in fields and woods.

Coprinus fimetarius.

Coprinus micaceus.

Cortinarius semisanguineus. Frequent.

Cortinarius sp. Very common in oak woods and found about the same time a year ago. A striking species with fulvous cap and very distant gills. It is usually strongly umbonate when young.

Cortinellus rutilans. Beside a pitch pine stump on an exposed bank on Brush Mountain.

Entoloma commune. Growing on grassy ground under white oaks.

Entoloma Grayanum. Half a dozen plants found growing gregariously in one spot.

Entoloma pallidum. On the ground in oak woods.

Galerula crispa. Found in a straw pile in an open field.

Geopetalum angustatum. Found twice.

Geopetalum petaloides. In an open grassy spot under white oaks. Found only once, but I do not recall having seen it in Virginia before.

Gymnopus dryophilus.

Gymnopus exsculptus. Found on dead wood on Brush Mountain. The margin of the pileus had become nearly black.

Gymnopus platyphyllus. Frequent.

Gymnopus radicatus. I found a large, gray form like *G. longipes,* with nearly glabrous stipe and another just like it, only with a cream umbo. Both were slimy and rugose on the surface.

Gymnopus strictipes.

Hebeloma sp. Gregarious and very abundant in low places under elm, birch, and fir trees on the college campus. Pileus cream-colored, slightly viscid. with mealy odor and taste; stipe milk-white.

Hydrocybe ceracea.

Hydrocybe conica. Growing gregariously in the grass at the edge of woods.

Hydrocybe flammea. Quite common; sometimes very small.

Hydrocybe psittacina.

Hypholoma appendiculatum.

Hypholoma lacrymabundum. Found once.

Inocybe geophylla. Found twice.

Inocybe spp. Probably six species, which I have not determined.

Laccaria laccata. Common.

Laccaria ochropurpurea. Two plants found.

Lactaria Indigo. Found once. Easily recognized by its color.

Lactaria lactiflua. Abundant.

Lactaria piperata. Abundant.

Lactaria scrobiculata. An attractive species having concentric zones and being tomentose on the margin when young. This was found under white oaks in Karr's Woods where I saw it several years ago.

Lactaria subdulcis.

Lactaria spp. One resembling *L. varia*, but with broad, distant gills. Another near *L. cinerea*. Very uniform in appearance and size. In dry, grassy places under white oaks in Preston's Woods.

Marasmius glabellus.

Marasmius oreades. Abundant.

Marasmius rotula.

Marasmius spp. Several which I have not determined.

Melanoleuca alboflavida. Rather abundant in a semi-shaded spot in oak woods, growing in leaf-mold. The specimens are rather above the average size of the species.

Melanoleuca melaleuca. Small, pallid plants growing among grass on an exposed lawn.

Omphalopsis campanella. On an oak stump. Frequent about Blacksburg on both deciduous and coniferous wood. Very abundant at Mountain Lake.

Panaeolus campanulatus.

Panaeolus retirugis.

Panaeolus semiglobatus.

Panellus stypicus.

Pholiota Johnsoniana. Large plants with a ring that falls away and very small plants, growing gregariously, with the ring breaking up as in *H. appendiculatum*. Size very different but the same plant.

Pleuropus albogriseus. Gregarious or cespitose in grassy woods. Spores angular, uniguttulate, $12 \times 7\ \mu$. Previously known from New York and Massachusetts.

Pleuropus obesus.

Pleurotus ostreatus.

Pluteus cervinus. Frequent.

Pluteus praerugosus sp. nov.

Pileus convex to nearly plane, with a slight umbo in early stages, solitary, 3–4 cm. broad; surface glabrous, very rugose, dry, fuliginous, darker at the center, long-striate on the margin; lamellae free, tapering behind, rather crowded, entire on the edges, white until colored by the spores, which are perfectly globose, smooth, with very large nucleus, almost hyaline under the microscope, pinkish in mass, $5\ \mu$ in diameter; stipe slender, nearly equal, pallid, glabrous, 3–4 cm. long, not at all twisted.

Type collected on a dead white oak log in Preston's Woods, Blacksburg, Virginia, July 16–31, 1920, *W. A. Murrill.*

Prunulus sp. Growing in clusters on a dead white oak log.

Psilocybe foenesecii. Common.

Russula albida. Small and rare.

Russula compacta. Pale-fulvous above with a chestnut tint, milk-white below, staining when touched; flesh sweet.

Russula delica.

Russula emetica. Common.

Russula foetens. Abundant.

Russula furcata. Abundant.

Russula nigricans. Found twice, and in both cases soon blackening.

Russula virescens. Abundant. Eaten by box tortoise, which was just leaving the plants, the ground being covered with chips as usual. Evidently he turned to this species when *Vaginata plumbea* was exhausted.

Russula spp. One milk-white all over, cespitose. Another large, with yellow cap, milk-white stem, and almost white gills.

Stropharia semiglobata.

Vaginata farinosa. Once in oak woods and twice on Brush Mountain.

Vaginata parcivolvata. Six or more plants growing near together and bringing up scraps of dirt that resembled volval patches.

Vaginata plumbea. Common in half a dozen varieties, including a large white one, but the fulvous form was most abundant. This last was especially liked by the box tortoise, which was found several times in different parts of oak groves feeding upon it. I was walking early one morning in Broce's white oak grove when I came upon two plants of this variety growing together and a tortoise beside them, which had devoured half of each plant. When I returned thirty minutes later, he had finished them, stems and all, down to the ground, leaving only a few chips that fell from his mouth while eating. He evidently preferred this species, because many specimens were found, either partly or entirely devoured in this manner peculiar to tortoises. Squirrels take the plants up and carry them to a stump, log, or tree. I was able to confirm my observations as to tortoises by watching two or three more at breakfast later in the week. When practically all the specimens of *Vaginata plumbea* in the woods were gone, *Russula virescens* seemed to be the next choice.

Venenarius Caesareus. Rare.

Venenarius cothurnatus. Three pure-white plants were first found growing gregariously under a white oak in Broce's Woods. Flies sucked their juice while drying and promptly fell over, apparently lifeless. In order to determine if they were really dead, I kept them covered for twenty-four hours,—and still have them with the specimens. The deadly character of this species was demonstrated later by using a "button" found in Preston's Woods, where I first saw the plant growing in abundance several years ago. A few days later, two good, typical plants were collected in the same woods and preserved. All of the specimens found about Blacksburg are white, showing no tendency to vary to darker forms.

Venenarius flavorubescens. Specimens closely resembling this species were found under white oak trees but it seemed difficult to distinguish them satisfactorily from *V. Frostianus.*

Venenarius Frostianus. Abundant.

Venenarius phalloides. Large and small white forms fairly abundant, ordinary dark form rare; also a whitish form with smoky center, and a large, shining, dark-lead-colored form,—the darkest I ever saw.

Venenarius rubens. Very abundant and of immense size, 20 cm. or more in diameter.

Venenarius solitarius. On the ground in woods. Base large and rounded, not radicate; surface white to grayish or reddish, covered with large warts; chlorine odor very decided. Also found the usual form on clay banks.

Venenarius spp. Two species were found that were not recognized, an avellaneous one in Preston's Woods and a pure-white one in exposed sandy soil on Brush Mountain. The latter resembled *V. cothurnatus* but had no boot and did not kill flies.

C. GASTEROMYCETES

Bovistella ohiensis. On a sunny lawn growing in grass. Large, white, covered with numerous small spines and granules, becoming brownish on top with age and isabelline all over when dried. This species is said to be very common in Ohio; I have found it also in New York City.

Crucibulum vulgare.

Geaster hygrometricus.

Lycoperdon cruciatum (*Lycoperdon separans* Peck). Common in fields.

Lycoperdon gemmatum. Occasional.

Lycoperdon spp. Three small species were found that I did not recognize. One was very smooth and white and grew in fields with *L. cruciatum;* another, found rarely in woods, had a smooth, grayish-marbled, reticulate-rimose surface; and the third, occurring frequently in woods, was distinguished by a dense covering of small, whitish to discolored spines.

Scleroderma verrucosum. On the campus in a low, shaded spot.

NEW YORK BOTANICAL GARDEN.

NEW JAPANESE FUNGI

NOTES AND TRANSLATIONS—IX

Tyôzaburô Tanaka

Helminthosporium papaveri K. Sawada sp. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. of Formosan Nat. Hist. Soc.) No. 31: 129, T. 6, xii, Dec., 1917, and in Bull. No. 128, Agric. Exp. Stat., Gov'nt of Formosa, "Taiwan ni okeru Keshi Byôgai Chôsa" (Diseases of poppy in Formosa) by K. Sawada, pp. 20–22, T. 7, vi, June, 1918. (Japanese.)

Conidiophores fasciculate or solitary, copiously branched, cylindric, many septate, yellowish-brown, 86–130 x 6–7 μ, terminating with a single conidium, after its abstriction a second conidium is formed; conidia cylindric, both ends blunt, 3–10 septate, constricted, yellowish-brown, 22–112 x 7–11 μ.

Parasitic on leaves, stems, peduncles and fruits of *Papaver somniferum*.

On leaves, spots are large, irregular, brown and pierced at the center when fully matured. On stems, the lesions causing rot are brown, and, when they are formed at the lower part, cause wilting of the whole plant; the decay soon appears at the petiole of leaves turning them to a dirty yellowish-brown color. The stem tissues, including cortex, are entirely disorganized and dead; at a certain stage a gray mould is found on the decayed surface. The appearance on the peduncles is similar to that on the stems. When the fruits are attacked the spots are orbicular, yellowish-brown or brown bordered with a blackish-brown periphery, and later develop gray mould from the center, which occasionally appears in concentric zones. No sound seed is produced from the diseased fruits. It is one of the most dangerous diseases of cultivated poppies in Formosa.

Type localities: Taihoku-chô Taihoku, Apr. 25, 1917, Funabiki; Taihoku-chô, Chônaihoshô, Apr. 21, 1917, K. Sawada.

Notes: Additional localities are recorded from Taichû-chô Koroton, June 8, 1918, K. Sawada; Nantô-chô Nantô, June 6, 1918, K. Sawada; Kagichô Chikutôki, Apr. 3, 1918, K. Sawada. (See second paper, p. 21.) After inoculation tests, the damping-off of poppy seedlings is proved to have been caused by the same fungus. This trouble was found by the author in nurseries of southern Formosa.

FUSICLADIUM THEAE K. Hara sp. nov. in Chagyôkawi (Tea Journal) **14**[4]: 16–17, 1 pl. T. 8, iv, Apr., 1919. (Japanese.)

Acervuli amphigenous, velvety, black; conidiophores filiform, straight or curved, thickened at the base, continuous to 3-septate, brownish at the lower part, light colored and often crooked at the upper part 40–70 x 4–5 μ; conidia terminal, occasionally arising from the crooked edges of conidiphores, cylindric or oblongovate, uniseptate almost at the middle, usually not constricted though sometimes constricted, blunt at the apex, somewhat pointed at the base, straight or curved, colorless or flavescent, 15–28 x 5–6 μ.

On leaves of *Thea sinensis*.

Type locality: Shidzuoka-ken Iwara-gun Kjiro-chô, Nov. 27, 1918, K. Hara.

Illustrations: 2 black and white halftone figures (figs. 8 and 9) showing tufts of conidiphores and conidia.

No *Fusicladium* has been reported on tea plant. This species is distinct from all known species by its almost colorless conidia.

MYCOSPHAERELLA THEAE K. Hara sp. nov. in Chagyôkwai (Tea Journal) **14**[5]: 9–10, 1 pl., T. 8, v, May, 1919. (Japanese.)

Spots orbicular or irregularly roundish, 3–4 mm. in diam., finally confluent, forming large irregular lesions, at first dark-brown, later becoming cinereous; perithecia epigenous, immersed, later with ostiola erumpent, gregarious, minutely punctiform, black, globose or depressed globose, 50–150 μ in diam.; well carbonaceous, fungoid-parenchymatous, dark-colored, composed of polygonal cells, 3–8 μ across; ostiola papillate or wart-like, with orbicular openings 10–13 μ across; asci tufted, cylindric clavate or oblongovoid, rounded at the apex, pedicellate at the base, octosporous, 30–42 x 6–8 μ; ascospores biseriate, oblong-ovoid or cylindric, both ends subobtuse, uniseptate, not constricted, cells unequal, upper ones being slightly shorter and broader, lower

ones much longer and narrower, every cell binucleate at first, later becoming homogenous, hyaline, 10–13 x 2–2.5 μ.

Parasitic on leaves of *Thea sinensis*.

Type locality: Gifu-ken Ena-gun Kawaue-mura, Apr., 1918, K. Hara.

Illustrations: 4 black and white halftone figures (figs. 5–6) showing spots, perithecia, asci and ascospores.

It differs from *Mycosphaerella punctiformis* in mode of occurrence and in detailed characters of ascospores.

Spots first appear on the surface of leaves as small, round, dark-colored areas of 1 mm. across, which enlarge gradually forming irregular patches of 3–4 mm. in diam., and later becoming confluent forming large irregular dead areas extending towards the leaf margin. Such areas are dark-colored brownish-gray and develop abundant black minute specks on the upper surface, while the lower surface of the leaf remains a dark-brown color.

MYCOSPHAERELLA IKEDAI K. Hara sp. nov. in Chagyôkwai (Tea Journal) **14**[5]: 10, 1 pl., T. 8, v, May, 1919. (Japanese.)

Perithecia amphigenous or more frequently hypogenous, gregarious or scattered, immersed, globose or depressed globose, apically ostiolate 50–80 μ in diam., wall parenchymatous, consisting of polygonal cells 5–8 μ in diam. across, carbonaceous ostiola papillate or simple, with round openings of 10–12 μ across, asci obovoid or oblong, rounded at the apex, pedicellate at the base or sessile, octosporous, 40–45 x 8–12 μ, ascospores 3-stichous or irregularly polyseriate, oblong-ovoid or cylindric, uniseptate, much constricted, cells unequal, upper ones mostly shorter and broader while lower ones are just opposite, at first granulate, later homogenous, colorless and hyaline, 13.2–16 x 5–5.5 μ.

Saprophytic on leaves of *Thea sinensis*.

Type locality: Shidzuoka-ken Inasa-gun Idaira-mura, Sept., 1918, K. Hara.

Illustrations: 2 black and white halftone figures (figs. 9 and 10) showing asci and ascospores.

M. Ikedai K. Hara differs from the former species in the shape of the asci, arrangement, shape and size of the ascospores. It is

named in honor of Isaji Ikeda, President of the Prefectural Agricultural Society, under whom the investigations were made.

MELIOLA CITRICOLA K. Hara sp. nov. in Shidzuoka-ken Nôkwaihô (Journ. Agric. Soc., Shidzuoka Prefecture) No. 263: 8–9, 1 pl., T. 8, viii, Aug., 1919. (Japanese.)

Young hyphae filiform, delicate, branching, septate, colorless or light colored, 2.5–3 μ across, mature hyphae thick, branching, septate, constricted at septa, often catenulate and easily detached, dark-brown, sometimes nucleate, 4–7 μ thick, detached cells (chlamydospores) ellipsoid or subglobose, 8–15 x 4–7 μ; conidia of *Triposporium* type astellate with 3–4 arms, arms thick at the base, tapering towards the apex and ending in a sharp point, 2–4 septate, 40–60 μ, perithecia globose or depressed globose, 200–230 μ across, wall naked, fungoid-parenchymatous, carbonaceous, brittle, dark-brown, cells 6–12 μ across; ostiola apical, not projecting, with orbicular opening of 15–20 μ across, asci obvate globose or ellipsoid, rounded at the apex, pedicellate at the base, thick walled, octosporous, aparaphysate, 40–70 x 30–40 μ, ascospores ellipsoid ovoid or subfusoid, tapering towards rounded ends, straight or curved, 6–7 transversely septate, often with longitudinal septa, hyaline, 28–45 x 7–12 μ.

Epiphytic on leaves, branches and fruits of *Citrus* spp.

This species appears mostly on the upper surface of leaves producing black or dark gray irregular patches which finally enlarge forming a thick incrustation all over the leaf surface. When fully matured the surface becomes velvety and spotted with minute black bodies and at this stage the black mass begins to peel off from the substratum.

Type locality: Shidzuoka-ken Agricultural Experiment Station, Apr. 25, 1919, K. Hara.

Illustrations: 3 figures (figs. 12–14) in 1 black and white halftone plate, showing perithecia, asci and ascospores.

It differs from *Limacinia theae* P. & H. Sydow & Butl. (Ann. Mycol. 9: 346) in the tapering and curved ascospores, intertwining hyphae without bristles, and in the absence of a particular pycnidial form. *Meliola penzigi* Sacc. resembles the present species in having naked perithecia, but the former is characterized by colored biseriate ascospores having 3 transverse and 1–2 longitudinal septa, while the latter is distinguished by heaping

non-seriate ascospores ellipsoid in shape and usually 7-septate, in size three times as large as the former. *Meliola camelliae* and *Meliola citri* do not agree with the present species in their bristled perithecia and in the size and shape of the ascospores.

GLOEOSPORIUM CARTHAMI Hori & Hemmi comb. nov. in Byôchûgai Zasshi (Journ. Plant Prot.) **6**[3]: 189. T. 8, iii, March, 1919. (Japanese.)

Marsonia carthami Fukui, ex Tanaka in Mycologia **9**[3]: 169, 1917.

Hemmi points out that the fungus has typically 1-celled ascospores, and should correctly be placed under *Gloeosporium* (subgen. *Colletotrichum*). In a later publication of the same author (Annals of the Phytopath. Soc. of Japan, **1**[2]: 1–11, March, issued June, 1919) the detailed characters of this fungus are thoroughly given in German. The disease was reported from Sapporo and Hyôgo, and is pretty serious in early summer months. The temperature relations of the development of this fungus are also given by Hemmi in Sapporo Nôrin Gakkwai-hô **10**[47]: 40, 49–52, Dec., 1918.

BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.

NOTES AND BRIEF ARTICLES

[Unsigned notes are by the editor]

Readers of MYCOLOGIA are invited to contribute to this department personal news items and notes or brief articles of interest to mycologists in general. Manuscript should be submitted before the middle of the month preceding the month in which this publication is issued.

Dr. G. R. Bisby, formerly of the University of Minnesota, has removed to Winnipeg, Canada, where he is professor of plant pathology at the Manitoba Agricultural College.

Mr. Paul A. Murphy, so well known for his work on potato diseases, is now located in the Division of Seeds and Plant Diseases, Royal College of Science, Dublin, Ireland.

Dr. W. A. Murrill lectured at Manchester, Vermont, July 8; examined types of *Poria* at Albany, July 9; and lectured again at Yama Farms, July 10. He is much indebted to Dr. House for assisting him in getting at the type specimens of *Poria*.

Mr. Freeman Weiss, formerly under the employ of the Department of Agriculture and the Minnesota Agricultural Experiment Station, investigating cereal diseases, has been appointed assistant pathologist in the Department of Agriculture and is engaged in investigating the potato-wart disease.

Mr. N. Rex Hunt has been transferred from the Office of Forest Pathology Investigations, Bureau of Plant Industry, to the Federal Horticultural Board to assist in the eradication of the potato-wart disease.

Dr. Charles Drechsler has taken up the investigation of vegetable decays and decay-producing organisms as an employee of

the Office of Cotton, Truck, and Forage Crop Disease Investigations, with headquarters at Brooklyn, New York.

Mr. D. C. Neal has accepted the position of plant pathologist for the Mississippi Agricultural Experiment Station, after resigning a similar position with the Georgia State Board of Entomology.

Mr. C. M. Tucker, recently graduated from the University of Missouri, has accepted a position with the Extension Division of the Florida College of Agriculture and will conduct extension work on the control of watermelon diseases.

Dr. F. Kølpin Ravn, of Denmark, died suddenly of blood poisoning, on May 25, at the home of his wife's parents at East Orange, New Jersey.

Mr. Julius Matz, who for the past year held the position of assistant pathologist at the Insular Experiment Station at Rio Piedras, Porto Rico, has been appointed chief of the Division of Botany and Plant Pathology at the same station.

Tagging instead of blazing trees is strongly recommended by Weir in *Phytopathology* for July, 1920,—with evidence to support his opinion.

Serious injury to Rhododendrons and Azaleas in the Northwest by *Armillaria mellea* was noted by Schmitz in the July number of *Phytopathology*.

On a recent visit to Albany, typical specimens of *Poria ornata* Peck and *Poria subacida* Peck were compared and the species found to be identical.

A list of ascomycetes new to Indiana, by Bruce Fink and Sylvia Fuson, appeared in the *Proceedings of the Indiana Acad-*

emy of Science for 1918, pp. 264–275. It contains about 140 species, including 2 new ones, *Pyrenopsis fuscoatra* Fink and *Verrucaria sordida* Fink.

Rusts on conifers in Pennsylvania are described and figured by J. F. Adams in Bulletin 160 of the Pennsylvania Agricultural Experiment Station, which also contains an important paper by the same author on sexual fusions and the development of the sexual organs in the Peridermiums.

Mrs. John R. Delafield sent in many interesting specimens of fungi from the vicinity of Buck Hill Falls, Pennsylvania, during her residence there the past summer and autumn. Many of them were accompanied by beautiful colored figures, as well as by valuable field notes.

Reddening of the leaves of *Rhus copallina* in New England has been ascribed to the action of *Exoascus purpurascens*. In Italy, Traverso has investigated two diseases of *Rhus coriaria*; one causing leaf coloration and die-back, ascribed to *E. purpurascens*, and the other appearing in minute, discolored spots caused by *Septoria rhoina*.

Experiments on the control of eelworms in Narcissus growing out-of-doors were reported a year ago by J. K. Ramsbottom in the *Journal of the Royal Horticultural Society*. Experiments with manures and chemical sterilizers were alike ineffective in freeing soils from nematode infection or in protecting crops from nematode attack. Experimentation on different crops with a view to securing a rotation that would avoid or minimize nematode attack showed that this organism may become so adapted to a particular host species as not to attack with severity other host species.

In a bulletin published in 1919 by the Trinidad Department of Agriculture, J. B. Rorer discusses the fungous diseases of the avocado, or alligator pear. He states that the only serious dis-

ease found on the fruit is the so-called anthracnose, which is identical with or closely related to the anthracnose of mango. Avocado die-back is of frequent occurrence throughout the Colony. This is due to *Diplodia cacaoicola,* which also causes die-back of cacao and of rubber. It is thought to enter by way of very young tissues through wounds made by the anthracnose fungus, growing then rapidly down the tree and killing back the shoots for a distance of two or three feet from the tip. The same fungus also attacks budded avocados.

Phomopsis juniperovora, a new species causing blight of nursery cedars, is described and figured by G. G. Hahn in *Phytopathology* for April, 1920. The disease is known in New York, Pennsylvania, and several states of the middle West.

Observations on some common and important diseases of the rhododendron on the Pacific Coast, by Henry Schmitz, appeared in *Phytopathology* for May, 1920. *Sporocybe Azaleae* attacks the buds and causes them to rot, while *Melampsoropsis Piperiana* attacks the leaves, producing the so-called "rust." Other fungi attacking the leaves are: *Lophodermium Rhododendri, Cocomyces dentatus, Coryneum Rhododendri, Sphaerella Rhododendri, Pestalozzia Guepini,* and *Cryptostictis* sp.

A note on our native barberry in connection with wheat rust, contributed by Stakman and Krakover to the May number of *Phtopathology,* mentions infected bushes found near Blacksburg, Virginia, May 18, 1919, by Fromme and Massey. It might be of interest to say here that in 1897 I made an extended survey of the distribution of *Berberis canadensis* about Blacksburg and found much of it infected with rust. Also, that the most badly rusted wheat I ever saw was found growing about limestone and shaly knolls covered with barberry bushes. Quantities of this material in various stages was taken by me to Cornell in the fall of 1897 and used there year after year in class demonstration and laboratory work.

An interesting article on the Phyllosticta blight of snapdragon, by Miss Edwina M. Smiley, appeared in *Phytopathology* for April, 1920. Little has been done as yet on the control of this disease, but the author advises the following precautionary measures. First, the removal of all debris from infested benches before new plants are put in and the use of only healthy plants for setting. The second precaution is the practice of soil watering, with proper ventilation of the house. Finally, snapdragons should be grown in cool houses, for the plants will do well in an average temperature of 15° C., a temperature at which the fungus can not thrive as a parasite.

A drain-blocking fungus was noted by A. Lorrain Smith in the *Transactions of the British Mycological Society* for April, 1920. In September, 1919, about fifty pounds of fungous material were taken from a sewer-pipe in London, thirty feet below the surface of the ground, and determined by Mr. Rea as *Fomes ulmarius*, which grows on elm trees. Since elm roots, like those of poplars and willows, often travel long distances in search of water, it is probable that the Fomes was connected in some way with elm roots or their remains in the pipe or adjacent soil. The fungous material was found in four different places and was removed at great cost.

Professor F. S. Earle spent several days at the Garden the past summer consulting the library in connection with his work on sugar-cane diseases in Porto Rico. Speaking of the mosaic, he said that he had proved by careful experiments that this very serious disease can be controlled by using only healthy seed and eradicating all infected plants as soon as they appear in the field. Something immensely interesting regarding the nature of this mosaic was also disclosed, which will soon appear in print. Referring to root-rot of sugar-cane, he said that all that had been written about *Marasmius Sacchari* in this connection was pure fiction, because it had nothing to do with the rot.

Crown gall has been recently investigated by Levin and M. Levine with a view to determining its analogy to animal cancer. Some of the plant tumors studied grew slowly and were not injurious, while others were malignant, and the appearance of highly differentiated tissues subsequent to and participating in the development of a malignant tumor is, it is claimed, unknown in animal cancer. The conclusion arrived at is that a fast-developing simple crown gall presents much analogy to animal cancer and offers ideal material for the cellular study thereof. The structure of the growing central part is identical in practically all crown galls thus far investigated. This structure, therefore, represents only one type among the large number of pathological processes grouped under the name of cancer. The study of crown gall, however, affords no secure ground for a claim that all human cancers are formed through the activity of an identical organism.

The following fungi were collected by W. A. Murrill on July 22, 1920, at Mountain Lake, Virginia, about 4,000 feet above sea-level: *Cordyceps militaris; Exobasidium Azaleae; Lachnocladium Schweinitzii; Laccaria laccata; Omphalopsis campanella; Gymnopus platyphyllus; Russula foetentula, R. foetens, R. furcata, R. flava,* and several other species; *Chanterel Chantarellus, C. infundibuliformis, C. minor; Vaginata plumbea* in several varieties; *Venenarius Frostianus; Crucibulum vulgare; Lycoperdon cruciatum; Ceriomyces communis; Fuscoporia ferruginosa* on dead chestnut; *Coriolus abietinus* on hemlock; *Inonotus radiatus* on birch; *Ganoderma Tsugae; Elfvingia megaloma; Elfvingiella fomentaria;* and *Pyropolyporus igniarius* in black, aborted forms on trunks of *Betula alleghaniensis,* as it occurs in Maine on *Betula lutea.*

Two papers on mushrooms by L. C. C. Krieger have recently been published under the auspices of Dr. Howard A. Kelly, of Baltimore, Maryland. One was a beautifully illustrated article in the May number of the *National Geographic Magazine* on the "Common Mushrooms of the United States," which has already

been very widely distributed; and the other a small pocket key to the genera of the gill mushrooms published as a chart, which is folded and bound for use in the field. The characters of the genera are shown for the most part by small pen sketches of typical species, and there is a brief illustrated glossary of terms relating to structure. This key may be obtained from The Norman, Remington Company, of Baltimore, for one dollar. The great advantage of any chart over a book is the opportunity it gives to compare a specimen at a single glance with every figure on it.

Notes on the Lower Basidiomycetes of North Carolina, by W. C. Coker, appeared in the Journal of the *Elisha Mitchell Scientific Society* for June, 1920. This is a continuation of the handsomely illustrated articles on North Carolina fungi which have been appearing for some time in the above-mentioned journal, and it contains descriptions and figures of many species in a number of different genera, such as *Gymnosporangium, Septobasidium, Exidia, Tremella, Tremellodendron, Sebacina, Dacrymyces,* and *Calocera.* The following species are described as new: *Ditiola Albizziae, Dacryopsis ceracea, Dacrymyces fuscominus, D. pallidus, D. Ellisii, Tremella subanomala, T. carneoalba, T. aspera, Naematelia quercina, Exidia Beardsleei, Platygloea caroliniana,* and *P. Lagerstroemiae.*

"A Critical Study of the Slime-molds of Ontario," by Mary E. Currie, appears in the *Transactions of the Royal Canadian Institute of Toronto* for 1919. The paper gives interesting descriptive and distributional notes of 118 species and varieties, in 29 genera; 47 species and varieties being recorded from Ontario for the first time, 36 being new to Canada, and 5 new to North America. The following were noted as parasites on fungi: *Badhamia foliicola* Lister, *B. magna* Peck, *B. utricularis* Berk., *Physarum flavicomum* Berk., and *P. polycephalum* Schw. The following nine were found at times fruiting on the leaves or stems of grasses or herbaceous plants, and in some cases at least are injurious to these plants: *Diachaea leucopoda* Rost., *Diderma*

effusum Morg., *D. testaceum* Pers., *Didymium squamulosum* Fries, *Fuligo septica* Gmel., *Leocarpus fragilis* Rost., *Mucilago spongiosa* Morg., *Physarum cinereum* Pers., and *P. sinuosum* Weinm.

The insect transmission of diseases is treated at length in an article of the greatest importance by F. V. Rand and W. D. Pierce in *Phytopathology* for April, 1920. According to the authors, the investigations of the past three decades have completely revolutionized our view of the rôle of insect transmission in both plant and animal diseases. Among the points to be studied are the following. It is necessary to determine on or in what part or parts of the body the contagium is carried; whether the transmission is mechanical or biological; how soon after taking up an infective principle transmission is possible; how long the insect remains infective; whether an infected larva may retain the contagium through its metamorphosis; whether the contagium can be transmitted to the offspring, and if so, for how many generations; whether the offspring can transmit the disease at any stage of its development; whether an infected insect remains infective after a period of feeding on non-susceptible hosts; and whether the contagium winters over in the insect. The mere fact, however, that the contagium of a disease is found in or on the body of an insect should in no case be taken as final proof of an insect relation to transmission. In many diseases an inoculating needle, a piece of wood, or *anything* which happens to come into contact with the diseased tissues will carry upon it some of the contagium. *The final criterion, then, should be the actual transmission of the disease under controlled conditions simulating as nearly as possible those found in nature.*

Artificial and insect transmission of sugar-cane mosaic is discussed by E. W. Brandes in a reprint from the *Journal of Agricultural Research* issued May 1, 1920. It is considered by the author as proved that the cell sap of diseased plants is infectious when introduced in the proper manner and that the disease can be transmitted by insects. Just what insects are responsible for

dissemination in the cane regions remains to be proved. The failure of the sharp-headed grain leaf-hopper to transmit the disease under the conditions of these experiments is surprising. This insect is very common on cane in Louisiana, and as a result of field observations suspicion was directed toward it from the first. Other leaf-hoppers are now being tested. The successful experiments with the corn aphis are of great interest scientifically, but it is believed that transmission of mosaic is restricted to this insect or to other aphids more abundant on cane. *Aphis maidis,* however, has been reported on sugar cane from practically every sugar-cane region in the world. That cane mosaic is analogous with other mosaic diseases is brought out by a number of facts, aside from the visible signs of the disease. As in many other mosaics, the infectious material does not seem to be highly specialized, but may attack other plants of the same family. The cell sap of infected plants contains some organism, not visible by ordinary means, which is capable of inducing the disease when injected into healthy plants. Leaves which are mature at the time of inoculation never show any signs of mosaic. This fact, typical of all mosaics, has been brought out in all inoculation experiments with sugar-cane. The disease can be transmitted by certain sucking insects. There is no known period of saprogenesis in the existence of the virus. Seed transmission of the virus is one of the phenomena concerning which divergent results have been recorded for the various mosaic diseases. This point has not been definitely settled for sugar-cane mosaic, but mosaic sorghum plants failed to produce mosaic progeny in two experiments.

INDEX TO AMERICAN MYCOLOGICAL LITERATURE

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INDEX TO VOLUME XII

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